



SPECIFIC CHARACTERISTICS OF GLAUCOMA PREVALENCE, DEVELOPMENT AND PREVENTION IN THE ELDERLY AND GERONTIC POPULATION

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Article history:	Abstract:
Received: July 11 th 2022 Accepted: August 11 th 2022 Published: September 20 th 2022	A review of the literature is presented and the "global burden of glaucoma in the gerontial population" is shown in different regions and populations based on a large-scale analysis. Ways to improve the disease prevention system are described and recommended. Scientific materials are important in determining preventive research and practices.
Keywords: Glaucoma, geront population, prevention, screening strategies..	

- The data of modern scientific studies and our own personal observations on the organization of antiglaucomatous work make it possible to distinguish a number of problems. Solving them, for example, in the population of geront age, increases the effectiveness of glaucoma prevention and creates conditions for its prevention in geronts:

- in current scientific studies, none of the glaucoma treatment methods is considered perfect and cannot replace blindness 100.0 percent [15,18];

- existing treatment methods themselves often increase the risk of complications [19,31];

- great progress has been made in the field of diagnosis and treatment of glaucoma, but despite this, the incidence of glaucoma is increasing worldwide and there is no possibility to stop its complications (blindness) [1,2];

- in almost all countries, up to 87% of the disease is detected late or is diagnosed at the stage of the glaucomatous continuum [4];

- Data on the prevalence of glaucoma vary dramatically, up to 6 times. According to them, it is impossible to come to a decision on the spread of the disease at the country, population and even racial level [5,6,7,8];

- to study and assess the epidemiology of the regional characteristics of the disease as a tool/approach that scientifically substantiates the effective prevention of glaucoma in different age groups, including the elderly, and in different regions, to develop a new system of its prevention in the modern population, including the long-lived exit is considered an urgent issue all over the world and in Uzbekistan [12,13,14];

- In Uzbekistan and its territories, no scientific research on this issue has been carried out in the last 25 years, especially in the elderly population [9]. Methodological approaches used in the past do not meet today's requirements. Moreover, according to our

forecast, the epidemiological situation of glaucoma in the conditions of Fergana Valley may have changed or worsened up to 5 times. This, without a doubt, confirms the need and need for new preventive epidemiological research;

-Uzbekistan is recognized as a country with an aging and growing geront population [WHO, 2017]. For example, it is in Uzbekistan that the oldest person in the world is confirmed and currently lives [10];

Modern scientific results, publications, dissertations and internationally collected experiences prove that by now almost nothing remains of "early glaucoma". In particular, the methods of early detection of glaucoma and scientific opinions about it have changed, today's glaucomatous or researchers dealing with this disease faced glaucoma combining several types of diseases (comorbidity), and therefore, the era of working with such a population has begun.

The mentioned and still existing scientific problems have not been investigated by organizing a special epidemiological study in the elderly and geront population. It remains open to solve the listed problems of glaucoma, mainly gerontoglaucoma.

These were the scientific basis and "motivation" for the planning and implementation of this research.

Dissertation work was carried out in accordance with the scientific-research work plans of Andijan State Medical Institute on preventive medicine. It assessed the characteristics of the prevalence, course and prevention of glaucoma in the elderly and geront population, and developed innovative programs and algorithms for the early detection of glaucomatous "endpoints".

According to the research design, it is considered a prospective analytical observation and a simultaneous epidemiological study. The research material consisted of a population of 553 patients with glaucoma undergoing inpatient treatment in the ophthalmology department of the Andijan State Medical Institute and a



group of 176 representative residents of the three regions of the Fergana Valley over 90 years old - geront population. In total, 729 elderly people (60-89 years old) and 53 people over 90 years old (geront population) were fully examined in the study. 645 of those examined were rural residents (86.8 percent) and 84 (13.2 percent) were urban residents. Geront men made up 66.1 percent and geront women made up 33.9 percent of the sedentary population.

Epidemiological research was carried out in 2 directions (prospective and simultaneous investigation) and using 4 types: 1) multi-year retrospective epidemiological-analytical research and ophthalmological screening was carried out on the basis of the department of eye diseases of Andijan State Medical Institute. Its object was the elderly population (60-74 years old), the elderly population (75-89 years old) and the geront population (90 years old and older) who applied to this treatment facility and underwent inpatient treatment in 2015-2018. . The dynamics of 4-year epidemiological descriptions were compared and evaluated. The 2nd simultaneous epidemiological study and ophthalmological screening was carried out in Namangan region, and its object was unorganized male and female population over 90 years of age of all districts and cities of Namangan (59 people; 15 of them were fully screened).

The 3rd simultaneous epidemiological study and ophthalmological screening was organized and conducted in Andijan region. Its object was 56 geront population of unorganized men and women of regional districts and cities according to the last electoral roll, of which 21 were fully examined.

The 4th simultaneous epidemiological research and ophthalmological screening was carried out in 76 groups of unorganized, strict selection of geront men and women of the districts and cities of Fergana region (according to the last election list), and 17 of them were fully involved in the screening.

All four ophthalmological screenings were carried out in three stages with the cooperation of a specially qualified screening team - "specialist ophthalmologist" and "family doctor" (stage I - comprehensive screening; stage II - preparatory measures; stage III - trial screening). Standardized and unified epidemiological, questionnaire, biochemical, instrumental, special and ophthalmological, physical and clinical, in-depth examination methods based on the need for special instructions were used in the examination.

Nesterov's classification was used to diagnose glaucoma and evaluate its clinical course. Intraocular pressure (IOP) and ocular hydrodynamics were

examined using bi-hourly, diurnal, and circadian tonometry to comprehensively assess ophthalmotonus. For a healthy geront population, the following limits of the IBS level were adopted: the lower norm - 15-18 mm above sea level; average norm - 19 - 22 mm. sim. above.; high norm ≥ 23 mm wire. above

Glaucoma stage criteria were used as follows: in the initial stage - Pt 22 - 24 and Ro - 18 - 22 mm sim.super.equal levels; in the advanced stage - 19 - 21 and 15 - 17 mm.sim.ust. and in the advanced stage, the limits of ophthalmotonus equal to 16-18 and 10-14 mm above sea level were accepted.

Data collected as a result of the research were studied for their statistical significance using Epi Info, SPSS statistics, and the 2021 program of the Microsoft office suite.

Before proceeding to the report of the research results, it is permissible to emphasize once again that large-scale and detailed epidemiological studies in the field of glaucoma have not been conducted in the Fergana Valley region of Uzbekistan for the last 27 years. An idea about the condition of the disease is based on the reports of ophthalmologists in the region. Such information cannot always be objective. Epidemiological studies are needed to get an idea about the true epidemiological situation [3,25].

Based on this, a part of the study studied the 4-year dynamics of the development of epidemiological indicators of glaucoma in the Fergana Valley and its changes in the elderly population.

It was confirmed that the incidence of glaucoma had a steady growth trend for 4 years. From the last 4th year of the study, the prevalence of glaucoma has decreased from 11.84% to 8.98% in men and from 19.18% to 10.61% in women. In general, it is confirmed that in the elderly population of the valley, women (10.61%) have glaucoma more frequently than men (8.98%) with a difference of 1.63% ($R > 0.05$). Its prevalence varies depending on the level of education and place of residence. For example, a 4-year prospective retroscreening-epidemiological study proved that the prevalence of glaucoma in different years is more than 3 times higher in average data, and secondly, in the population of urban gerontological age (13.3% and 25.5% in men and women). compared to the population living in the countryside (from 86.7 percent and 87.2 percent), low morbidity is observed with a difference of about 9 times ($R < 0.001$).

These data almost confirm the results obtained by other researchers in current populations [11,16,17].

In a 4-year retrospective epidemiologic study, it was again confirmed that the frequency of detection of OBG in the elderly population of the valley is 26.1%, the



growth trend is 8.0% per year. This "growth" is present in both men and women, but the intense coloration is more severe in women than in men. Its frequency is 29.4% in women and 21.6% in men.

According to 4-year retroscreening, YoBG is observed in the male and female population, under the influence of gerontological age, with an insignificant difference - 53.7% and 46.4% average prevalence. There is a clear gender bias and, in general, it is represented by a prevalence of 49.4 percent in the general adult population. Compared to OBG, it is more determined with a difference of 23.3 percent ($R < 0.01$). That is, these indicators attract attention with their highness. In the last century, the Fergana Valley was confirmed as an endemic area of glaucoma, and its prevalence in Uzbekistan was confirmed not exceeding 7.0 percent (179). In the republics of the former Soviet Union, the prevalence of glaucoma ranged from 0.2% to 60.0% [78,81]. Such difference, in our opinion, is interpreted correctly if it is explained by its size, unequivocal, lack of methodological approaches.

Another important result of the 4-year ophthalmoscopy is that during the follow-up years, mixed glaucoma increased by 2.7 percent per year among the elderly population, and the 4-year increase was 11.1 percent. Total mixed glaucoma (AG) is represented by a prevalence of 13.4% with a difference of 4.0%, more women (15.0%) than men (11.0%) are recorded ($R < 0.05$).

It is also proven that almost every tenth of the population of gerontological age (and women - every seventh) does not take active medication prophylaxis of glaucoma, and as a result, glaucoma attacks were observed with an average frequency of 9.4%. It is worth noting that such a transition is significantly higher in women. Therefore, the need to improve the secondary prevention system in gerontoglucoma has increased.

For comparison, in Uzbekistan, such scientific studies have not been carried out, and changes in almost all forms of glaucoma have not been evaluated in long-term observations. As a consequence, the rate of glaucomatous sequelae is increased, and the data of our study confirm this. In particular, during the 4-year epidmonitoring, terminal glaucoma (TGI) is detected with an average frequency of 18.3% (in men - 23.4% and in women - 14.7%) in the examined contingent. The negative effect of the gender factor was clinically significant in the male population ($RR=1.59$; $\chi^2=6.42$; $R=0.01$).

In the gerontological population (between 60 and 89 years old), the age factor is confirmed as a risk factor for the development of glaucoma. Because the

prevalence of OBG increases up to 2.3 times depending on age. However, the effect of "age factor" on the development of BG was not clinically significant in the population of 60-74, 75-89 and ≥ 90 -year-olds ($RR=0.4$; 1.0; 0.2). YBG was recorded with prevalence frequencies of 56.5%, 50.7% and 11.8% in these age groups.

Under the influence of the age factor, according to the results of the 4-year follow-up, ArG in the population is more than twice as frequent in men - 60-74 years old ($R < 0.01$), and more than 6 times more often than in 75-89 years old ($R < 0.001$). A similar trend is confirmed in women, but the influence of the age factor in the origin of ArGI has clinical significance in the population aged 60-74 years and it is confirmed that this association is strong ($RR=3$; $\chi^2=36.8$; $R < 0.05$).

Prospective 4-year epidemiological monitoring clearly confirms such "age-related syndrome" in glaucoma attacks and terminal glaucoma. It is confirmed that the influence of the age factor on the attack of glaucoma has a strong significance in 60-74-year-olds and that the relationship is strong [$RR=2.2$; $\chi^2=21.47$; $R < 0.05$].

In the case of terminal glaucoma, the highest frequency is found in people ≥ 90 years old (70.6 percent). Compared to it, 60-74-year-olds with a 3.8-fold lower prevalence (18.6%) and 75-89-year-olds with a 3.3-fold lower percentage (21.3%) are recorded.

Epidemiological studies carried out on a global scale made similar conclusions, and the high epidemiological characteristics of glaucoma in valley conditions with insignificant differences were evident in the 4-year ophthalmoscopy [23,24].

In Uzbekistan, there is no scientific data obtained in this direction: most of them are clinical results or data from a simultaneous epidemiological investigation.

From the prospective epidemiological study, it became clear that open-angle glaucoma, terminal glaucoma and glaucoma attacks under the influence of the "rural factor" are detected less frequently than in the urban population.

In addition, it is confirmed that the "rural factor" has a protective effect to a certain extent, compared to the "urban factor" in mixed glaucoma and acute glaucoma.

Age factor as risk factors of glaucoma in gerontological age population (in OD - $R=0.0167$; $P=0.06$; in OS - $R=0.0199$; $P=0.02$), increased systolic arterial pressure ($R=0.055$; $R=0.4$), increased diastolic arterial pressure ($R=0.001$; $R=0.06$) and increased pulse pressure ($R=0.0018$; $R=0.56$) are confirmed.



In addition, in another 4-year epidemiological study, confirming the results of other researchers, it was established that glaucoma is one of the rapidly increasing diseases in the valley [20,29]. Features such as diagnosis and often unusual clinical course are also confirmed to be typical of "valley gerontoglucoma". Similar data have been obtained in other studies, but mostly in middle-aged populations and clinical observations [21].

Therapeutic comorbidity is confirmed as a risk factor in the formation and clinical course of glaucoma in the elderly population. The development and exacerbation of all types of gerontoglucoma are associated with cardiocomorbidity (8.27%), pulmonary comorbidity (0.74-2.5%), neuroendocrinocomorbidity (5.27%), gastroenterological comorbidity (0.36%), and nephrocomorbidity (0.36%). percentage) is determined based on.

Consideration of these epidemiological conclusions in the population of gerontological age improves glaucoma treatment-prevention programs and algorithms, reduces medical, social and economic losses.

Based on the scientific and practical needs and necessity, in one part of the research, the epidemiology of glaucoma was studied in the population of geront (men and women over 90 years old) of the Namangan region of the Fergana Valley, its clinical course and mechanisms of formation, as well as specific and important aspects of primary, secondary and tertiary prevention were determined.

Based on such standardized and unified examination methods, ophthalmoscopy in the case of gerontoglucoma has not been carried out not only in Uzbekistan, but also abroad. Therefore, it was expected that there would be great interest and enthusiasm for its results.

The characteristics of gerontoglucoma in the population of this region were expressed as follows: 1) unfavorable family conditions (loneliness, family and not having a family) are confirmed by 100.0% as a risk factor; 2) 100.0% of lack of information is related to the origin of gerontglaucoma (60.0±12.65% in men and 40.0±12.65% in women); 3) smoking factor is proven as a risk factor for glaucoma in almost every second man (46.67±12.88 percent) and more than 6.67 percent of women [$\chi^2=3.010$; $RR=0.057$; $P=0.083$]; 4) smoking intensity increases the risk of glaucoma to 33.3% in men and 26.7% in geront women.

In this population, OBG - 66.67 ± 12.17 percent (in men - 77.78 ± 13.86 percent and in women - 50.00 ± 20.41 percent), YoBG - 33.33 ± 12.17 percent (in men - 22 ,22±13.86 and in women - 50.0±20.41

percent), glaucoma attacks - 40.0±12.65 percent (in men - 33.33±15.71 percent and in women - 50.00±20 .41 percent) and terminal glaucoma - 80.00 ± 10.33 percent (in men - 77.78 ± 13.86 percent and in women - 83.33 ± 15.21 percent). It has been proven that all forms of gerontoglucoma are strongly related to gender and age factors. Glaucoma occurs and progresses with high frequency mainly in the 95-99 and 90-94 age groups.

The significant pathogenic role of ophthalmic morbidity (simultaneous occurrence of more than 2 other eye diseases) in the formation of gerontoglucoma is also confirmed: in 100.0 percent of cases, the disease develops and passes against the background of ophthalmic morbidity (cardiac comorbidity, pulmonary comorbidity, nephrocomorbidity, gastrointestinal comorbidity, neuroendocrine comorbidity).

Total glaucoma in the geront population of Namangan with a frequency of 3.86 ± 0.58 percent (4.44 ± 1.125 percent at 90-94, 1.19 ± 1.18 percent at 95-99, 5.71 ± 5.71 at ≥100 3.92 percent) is determined (from 8.41 ± 2.68 percent in men and 2.13 ± 0.86 percent in women). The frequency or risk of developing glaucoma increases up to 5-fold with age, and the "peak frequency" is noted at ≥100.

Another peculiar aspect, known from our analysis, is that in the geront population, glaucoma of one eye does not occur, and in 100.0% of cases, glaucoma of both eyes develops. The recording of glaucomatous continuum (blindness) with a frequency of 100.0 percent also attracts attention.

So, gerontoglucoma in the conditions of Namangan region is not only represented by an epidemic spread, but also causes 100.0 percent "glaucomatous ophthalmological hard points" (blindness, disability, frequent admission to the hospital, glaucoma attacks, ophthalmological acute conditions, exacerbation of therapeutic comorbidity). is enough. The geront population is considered to be the only way to be saved from these undesirable clinical conditions - the creation and systematic implementation of an active prevention system.

A special simultaneous research observation organized and carried out in the population of long-lived people of Fergana region also confirmed that the need to create new technologies for the prevention of gerontoglucoma is increasing year by year. Our acknowledgment by following scientific sources, in another scientific observation, such conclusions are also reported and presented in studies conducted in other parts of the world [28,30,32].



The following specific features of the development and clinical course of gerontoglucoma in Fergana region, in particular, confirming the mentioned points, are determined by the following epidemiological descriptions:

Social and family factors (100.00 ± 00 percent) and common risk factors (smoking 17.65 ± 9.25 percent; ethnic and age factors) are confirmed as pathogenic factors in the origin of gerontoglucoma; 2) all forms of glaucoma are represented by specific distribution frequencies - OBG - 70.47 ± 10.29 percent (in men - 66.67 ± 27.22 percent and in women - 78.57 ± 10.97 percent), YoBG - 23.53 ± 10.29 percent (men - 33.33 ± 27.22 percent and women - 21.43 ± 10.87 percent), terminal glaucoma - 64.71 ± 11.59 percent (men - 33.33 ± 27.22 percent and in women - from 71.43 ± 12.07 percent), glaucoma attacks - 23.53 ± 10.29 percent (in men - from 33.33 ± 27.22 percent and in women - from 21.43 ± 10.97 percent), primary OBG and YoBG - from 5.42 ± 1.46 and 1.67 ± 0.83 (in men - from 5.56 ± 3.82 and 2.78 ± 2.74 percent, in women - from 5.39 ± 1.58 and from 1.47 ± 0.84 percent) and glaucoma of both eyes - from 100.00 percent in men - in women and in all age groups; 3) In 100.0 percent of cases, regardless of age and gender, glaucoma is formed and passed along with ophthalmic morbidity.

In general, total glaucoma is observed with a prevalence of 7.08 ± 1.66 percent in the population of the geront age of Fergana region (8.33 ± 4.61 percent in men and 8.33 ± 4.61 percent in women) and 2, It is determined by multiplying by 5 times.

It has been confirmed that the prevalence of glaucoma in this region is not high, and it is confirmed by equal prevalence rates in geront males and females. The influence of the gender factor is not significantly confirmed, but the age factor is confirmed as a definite risk factor for gerontoglucoma.

A separate simultaneous epidemiological study was conducted in order to determine the basic scientific basis of early detection and elimination of glaucomatous "end stages" in the geront population of Andijan region of Fergana region. In this epidemiological population, gerontoglucoma is represented by the characteristics: in men and women, the participation of the gender factor in the development of the disease is 38.10 ± 10.60 percent and 61.90 ± 10.60 percent, and the family factor is 38.10 ± 10.60 percent and 61.90 ± 10.60 percent, informativeness - 38.10 ± 10.60 percent and 61.90 ± 10.00 percent, professional factor - 38.10 ± 10.60 percent and 61.90 ± 10.60 percent, and the

contribution of creativity + 14 from $.29 \pm 7.64$ percent and 9.52 ± 6.41 percent.

The prevalence of gerontoglucoma, different from the other two regions of the valley, is characterized by a gender- and age-related characteristic, and is characterized by more than the results obtained in other regions of the world [22,26,27], confirmed as follows: OBG - 95.25 ± 4.65 percent (in men - 87.50 ± 11.69 percent and in women - from 100.00 ± 0.00 percent), YoBG - 4.76 ± 4.65 percent (in men - 12.50 ± 11.69 percent and in women - from 0.00 ± 0.00 percent), terminal glaucoma - 38.10 ± 10.60 percent (in men - 62.50 ± 17.1 percent and in women - 23.08 ± 11.69 percent), glaucoma attack - 4.76 ± 4.65 percent (in men - 12.50 ± 11.69 percent and in women - 0.00 ± 0.00 percent), primary OBG - 5.65 ± 2.07 percent and 3.67 ± 1.00 percent in men and women respectively, primary YoBG - 0.81 ± 0.80 percent and 0.00 ± 0.00 percent, and glaucoma of both eyes - 100.00 percent in the total geront population (in all age groups and both men and women). The total prevalence of glaucoma is 4.39 ± 0.94 percent in ≥ 90 -100-year-olds (6.43 ± 2.22 percent in men and 3.67 ± 3.00 percent in women).

The frequency of detection of ophthalmic comorbidity with gerontoglucoma is observed in almost every fourth population of Andijan (19.05 ± 8.57 percent) (in men - 12.50 ± 11.69 percent and in women - 23.08 ± 11.69 percent). The frequency of comorbidity, in conclusion, is noted with a high frequency in gerontoglucoma and is confirmed as an "aggressive" risk factor that aggravates the origin of the disease in both men and women. The risk of developing glaucoma and glaucomatous continuum, strongly dependent on comorbidity, is more than doubled in the geront population [$\chi^2 = 0.009$; $R=0.923$; $RR = 1.938$; $95\% \text{ II } (0.145 - 25.927)$].

In the study, the screening results were generalized and statistically processed and evaluated in the Fergana Valley region. The following has been proven: 1) prevention of glaucoma, which is "built" on the results of epidemiological research, is considered a priority direction that reduces the disease and preserves physiological progeria; 2) the viability of this concept was confirmed during the research: an "innovative product unique in the world" was created in the geront population, which was monitored during the entire research years and an active prevention program was implemented. This is Khuvaido Umarova, a citizen of Buvaidda District of Fergana Valley, who has reached the age of 127 years and 6 months and is currently living without glaucoma..



Epidemiological summary and diagnosis:

Physiological progeria, almost healthy; $R_0 = 21$ mm wire, $P_t = 24$ mm wire.

So, it was confirmed that there is no limit to glaucoma and it is possible to live actively without it even in old age, when regular profaol ophthalmoscopy is carried out according to the program and algorithm developed by us.

When gerontoglucoma was epidemiologically characterized and evaluated in the valley-wide population of long-lived people (UUKP), the following details were confirmed, regional characteristics were distinguished: 1) OBGv in UUKP is confirmed with a frequency of 81.13 ± 5.37 percent (in men - 80.00 ± 8.94 percent and in women - from 81.82 ± 6.71 percent) 2) the frequency of spread of STD is 18.87 ± 5.37 percent; 3) terminal glaucoma is confirmed by the prevalence of 58.49 ± 6.77 percent (in men - 65.00 ± 10.67 percent and in women - 54.55 ± 8.67 percent); 4) BOBG - 5.99 ± 1.45 percent and 3.21 ± 0.61 percent in men and women; 5) geront men and women differ by almost two times - 1.50 ± 0.74 percent and 0.71 ± 0.29 percent; 6) glaucoma of both eyes is observed with a frequency of 100.00 ± 0.00 .

In the population of the valley ≥ 90 -100 years of age, glaucoma is formed and passes in 67.92 ± 6.41 percent of the time associated with ophthalmic morbidity (in men - 65.00 ± 10.67 percent and in women - 69.70 ± 8.00 percent).

It has been proven that by providing preventive care - early identification and "stopping" of the background of comorbidity in the geront population, it is possible to reduce glaucoma "end points" up to 70.0%. Profaol practice, in valley conditions, shows a positive effect, providing uncomplicated passage of glaucoma, safe therapy and complete prevention in every fifth patient.

In general, the prevalence of gerontoglucoma in the valley is 20.75 ± 5.57 percent (in men - 25.00 ± 9.68 percent and in women - 18.18 ± 6.71 percent). Its formation is characterized by significant and strong influence of gender and age factor.

If priority emphasis is placed on screening ophthalmology in the valley conditions and treatment programs/algorithms are improved based on it, our data confirms that, geront men and geront women about every fourth, and about every fourth of geront women, have glaucoma without an attack or exacerbation.

As a result of our research or as an "innovative product" of it, we created a program and algorithm of ophthalmoscopy that provides early

detection and effective control of gerontoglucoma, recommended for practice.

This program and algorithm dramatically increase the possibility of early detection and elimination of the irreversible process of glaucoma (blindness) in the geront population.

According to the conclusion of our research, establishing/diagnosing gerontoglucoma based only on the condition of ophthalmotonus and clinical symptoms leads to biased and incomplete diagnosis of the disease and its missed stages. From this point of view, within the scope of our research, the developed "screening program and algorithm for the prevention of gerontoglucoma" has a social, economic and medical effect: • it increases the possibility of early diagnosis of the early stages of the disease and asymptomatic cases to 100.0%; • elimination of non-adherence to the complex and early detection of chronic progressive course of glaucoma increases up to 65% in geront men and up to 64% in women

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